

Low-Cost, Integrated Ground Test, Simulation, and Flight Control Development Environment, Phase I

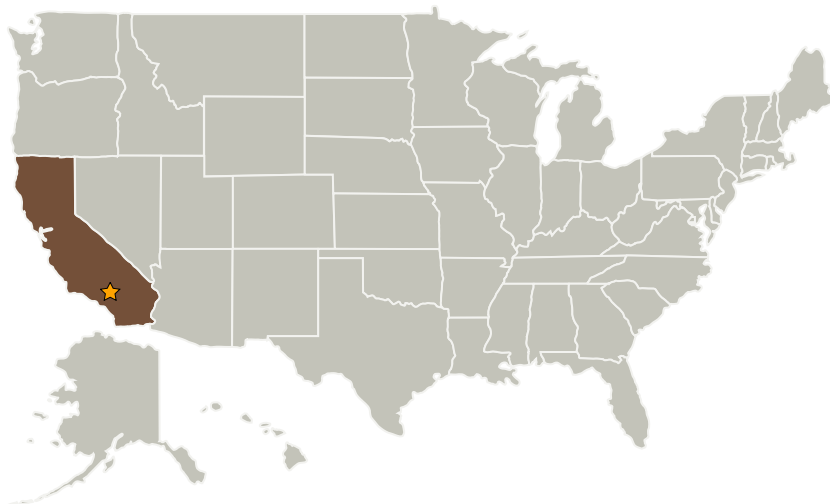
Completed Technology Project (2006 - 2006)



Project Introduction

An important mission for NASA is the development of revolutionary flight concepts and technology. The development of Micro unmanned air vehicles (MAVs) and Mars aircraft has received considerable attention recently. Unlike conventional aircraft, MAVs and Mars aircraft suffer from operation in an extremely low Reynolds number flight regime. Generally, a low Reynolds number is considered to be between 150,000 and 500,000. Both MAVs and Mars aircraft, however, can have operational Reynolds number regimes from 20,000 to 120,000. At these extremely low Reynolds numbers, the aerodynamic flow features are dominated by laminar separation and separation bubble effects, which are highly unstable and very dependent upon the free-stream conditions and atmospheric turbulence. Although it is often argued that an exploratory vehicle will operate over a benign portion of the flight envelope, an encounter with strong winds or gusts, particularly during a maneuver, could excite a highly non-linear response. This means that the assumption of linear derivatives for stability and control may not be valid, which could cause the loss of a vehicle designed with a control system based on linear assumptions. It is proposed that a low-cost, integrated ground test, simulation, and flight control development environment be created to address these challenges.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Rolling Hills Research Corporation	Supporting Organization	Industry	El Segundo, California

Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.3 Aeroelasticity